TANGANYIKA

MINISTRY OF AGRICULTURE

Annual Report

of the

Department of Agriculture

1961

PART I

Part II is in the press

N.C.P
R.A.M
A.M

COMMONWEALTH MYCOLOGICAL INSTITUTE
20MAR1964

1963
PRINTED BY THE GOVERNMENT PRINTER
DAR ES SALAAM
Price Shs. 5/-

Annual Report

of the

Department of Agriculture

1961

PART I

CONTENTS

		Page
I.	Introduction	1
II.	Weather	2
III.	Main Crops:	
	Sisal	2
	Coffee	3
	Cotton	4
	Cashewnuts	5
	Cassava and Sweet potatoes	6
	Coconuts, Copra and Coir	6
	Maize, Sorghum and Millets	6
	Oil Seeds	7
	Paddy	7
	Pulses	8
	Pyrethrum	8
	Seed Beans and Seed Peas	8
	Sugar	9
	Tea	9
	Tobacco	9
	Wattle	10
	Wheat	11
IV.	Minor Crops	11
V.	Three-Year Development Plan	13
VI.	Vermin and General Pests	15
VII.	Land Planning, Soil and Water Conservation and Land Usage Schemes	16
VIII.	Irrigation	17
IX.	Animal Husbandry	18
X.	Animal Draught and Mechanization	19
XI.	Staff Training and Agricultural Education	19
XII.	Agricultural Extension Methods	20
XIII.	Fisheries	22
XIV.	Research	24
XV.	Nutrition	25
	Appendix I. Rainfall	26
	Appendix II. Crop Production figures	26
	Appendix III. Exports	32

TANGANYIKA

ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE, 1961

Part I

SECTION I

Introduction

1961 appeared at one time as though it would bring an agricultural disaster to the whole country, but fortunately conditions improved in some regions at the crucial period and the position was saved to some extent. The Central Region, after six successive years of satisfactory rainfall, had a serious drought and famine relief measures were necessary over a large part of the Region. The Northern region, had probably its worst season agriculturally for the past 60 years, as the short rains failed completely and the long rains started late and finished early. Early plantings of food crops were attacked by Army Worm and later plantings failed because of drought. Famine relief measures then became necessary in a region which normally exports surplus food to other parts of the country. Tanga and Eastern Regions were also affected by drought, but to a lesser extent, though relief measures were necessary in certain limited areas. On the other hand, the Western Region had a successful year for all its crops, and Southern Region was not far behind despite the partial failure of the cashew crop. The Lake Region cotton crop failed to come up to early expectations but, taking into account the far from ideal conditions which it encountered, amounted to a very creditable total. Southern Highlands had, overall, a fairly undistinguished year largely due to a badly distributed rainfall. The failure of the early rains in West Lake Region reduced the coffee crop considerably and generally it was a poor year in this part of the country.

Although the crops offered for sale were inevitably diminished in quantity from previous years, this was offset to some extent by increased prices for good crops, and farmers in the areas which were favoured by the rains had an unusually good year.

In the last few months of 1961 there was particularly heavy out of season rain over most of the country and the consequent waterlogging, and in some cases flooding, reduced chances of good crops in 1962.

There was a significant increase in the number of requests for advice and assistance from both individuals and groups of farmers. Such progress is encouraging, but the number of enlightened or emergent farmers is still relatively small and there is a great deal of hard work ahead.

In the last six months of the year much of the ground-work for the Three Year Development Plan was prepared. The details will be dealt with later in this Report.

The decision was made to establish the Agricultural College in Morogoro and a suitable area of land was secured for the College buildings and farm. Building work was started on the first of the Farm Institutes, situated at Msinga in Kilimanjaro District, and preparations were made for a second institute at Seatondale near Iringa.

The work of the Fisheries Division was expanded and encouraging results were obtained particularly in Central Region. Land and Farm Planning Units and the Tanganyika Agricultural Machinery Testing Unit, had a busy and successful year. The demands for soil conservation by Mechanical Services were limited by lack of capital as a result of the poor year in Northern Region.

From the staff aspect, 1961 was one of the most difficult in the history of the Department. Frequent staff changes were necessitated by the premature retirement of a number of expatriate officers and the absence of Senior African Staff on courses of further training. By the end of the year the position was much less confused and the pattern for the future began to emerge with the appointment of African Officers to take over the agricultural work in a number of districts. I am deeply grateful to the entire staff of the Department for the way in which they rose nobly to the occasion in a momentous but at times rather bewildering year.

SECTION II

Weather

Climatically 1961 was a year of extremes. Following the failure of the 1960 "short rains" in a number of areas the eagerly awaited "long rains" started very late and finished earlier than usual. Even in the regions which had a reasonably successful crop year, the rainfall was below average. During the last three months of the year the dry season ended abruptly with the arrival of torrential rain which, punctuated by brief dry spells, continued until the end of December. Planting for the 1962 season was seriously hampered by this unexpected deluge, and flood damage was extensive, but the water table, which was very low by the end of August, almost certainly was restored, and in the cattle areas pastures which had become like deserts suddenly took on a new lease of life.

Rainfall figures are given in Appendix I.

SECTION III

Main Crops

Crop production figures or tonnages of crops marketed are given in Appendix II and agricultural exports from Tanganyika in Appendix III. Details of sisal, coffee, cotton, tea and pyrethrum production are provided by the appropriate marketing authority and can be given with confidence. The figures given for other crops are of necessity, estimated as much of the buying and selling of such crops is done outside local markets. As Co-operative Societies broaden their activities the figures available for the latter category of produce will become more accurate.

Sisal

The importance of sisal to Tanganyika was again amply illustrated by the export value of the crop, £14,028,099 which is 40 per cent of the agricultural exports of the country. Production amounted to 197,968 tons which is 6,500 tons lower than the 1960 figure. The decrease can be attributed almost entirely to adverse weather conditions in the last quarter of the year. Despite the drought conditions in the first six months, when several decorticators were put out of action from lack of water, production by the end of the third quarter was over 3,000 tons above the corresponding period in 1960.

The downward trend in the prices of all grades of sisal which began early in 1961 continued until October when the price c.i.f. U.K. for No. 1 grade was £82 per ton, and for No. 3 Long was £80 per ton, the lowest level since the second quarter of 1959. The prices showed signs of recovery in November and the recovery continued in December when the price for No. 1 grade stood at £88 per ton and that for No. 3 Long at £87.

Many estate owners are planting leguminous cover crops between the sisal rows and the practice of liming old sisal land is now general amongst the progressive estates. In Eastern Region the practice of returning sisal waste to the land is on the increase.

The hybrid sisal developed by the Research Station at Mlingano was multiplied in a number of areas but has unfortunately proved susceptible to disease and to *Weevil* attack. It is hoped that it will be possible to control both conditions economically.

There is an increasing interest in the crop being shown in Tanga by African farmers who are under the impression that large profits can be made by selling green leaf to nearby factories. In fact, the returns of two African concerns which are engaged in producing green leaf are in the region of Shs. 120/- per acre when the crop is fully mature, this compares unfavourably with the returns obtained from cassava or cashew.

The hedge sisal industry in Lake Region continued to expand; production totalled 15,500 tons, an increase of 3,000 tons over 1960 production. Part of the increase is attributed to the need for ready cash to purchase foodstuffs in areas where there were temporary shortages. Prices ranged from 23 cents to 40 cents per lb. of fibre.

Representatives of the Tanganyika Sisal Marketing Association held discussions with the Victoria Federation of Co-operative Unions and sisal factory owners with a view to the marketing of hedge sisal fibre through the Association; a number of problems, including quality and processing charges, have yet to be finalized.

Coffee

After the bumper crop of 1960 and the drought in the early part of 1961, the Northern Region Arabica crop was a poor one. The Southern Highlands Arabica crop was disappointing largely because of poor rain distribution, but the Southern Region showed an increase over 1960 although this can largely be attributed to increased plantings over recent years. The heavy rain in the latter part of 1961 brought on heavy flowerings in all Arabica areas, and there are prospects of a good crop in 1962. West Lake Region which produces "hard" coffee from both Robusta and Arabica had a poor year, and production fell by some 3,000 tons compared with 1960. Prospects for the "hard" coffee crop in 1962 are good.

Total exports of clean coffee amounted to 24,615 tons valued at £6,762,418 as compared with 25,077 tons valued at £7,325,669 in 1960. These figures can lead to confusion as it should be borne in mind that exports in 1961 include a proportion of the crop harvested in 1960. In signing the International Coffee Agreement in January 1962, Tanganyika has agreed to limit exports of coffee to traditional markets and to contribute towards an international programme for the promotion of increased coffee consumption throughout the world.

During the period of this Agreement, which ends on 30th September, 1962, it is estimated that Tanganyika will be called upon to contribute some £25,000 towards the sales promotion programme. In spite of the acceptance of a limited export quota it is, however, expected that most of Tanganyika's crop from the 1961 harvest will be marketed normally since the crop itself has been reduced by about 20 per cent due to unfavourable weather.

The Agreement was negotiated in an attempt to stabilize prices on the world coffee market in the face of an annual over-production of about 20 million bags beyond world consumption. This year surplus stocks, held mainly by Brazil, Colombia and the Ivory Coast are expected to reach 60 million bags (world consumption of imports amounts to some 40 million bags annually).

(a) *Mild Coffee*

With the exception of Southern Region, there was a marked fall in production in all the main growing areas, but this is almost certainly a temporary lapse which was beyond the control of the growers.

The total production of mild coffee amounted to 13,670 tons of which 9,511 tons came from Northern Region, 2,125 tons from Southern Highlands, and 1,500 tons from Southern Region. The total 1960 production was 21,378 tons.

In Moshi, the Kilimanjaro Native Co-operative Union took over the running of all nurseries from the Chagga Council, and in turn handed the work over to individual societies, where societies wished to continue with the work. This appears to be a retrograde step as there are over sixty societies and only 11 nurseries, the latter formerly run on a centralized basis. In Rungwe, the main growing area of Southern Highlands, the nurseries come under the control of the Union and the system works very successfully. In Southern Region where the industry is still a developing one, it was decided that primary societies should take over the production of seedlings from individual growers. Departmental staff have continued to advise on, and in some cases supervise, nursery work in all the growing areas.

Improvement of cultural practices in the field continued although progress is necessarily slow. As a result of a visit by a panel of experts from Lyamungu to the Matengo Mountain area of Songea District, greater efforts are being made to improve shading, pruning, and mulch techniques. The replacement of old coffee trees on Kilimanjaro has continued.

On Kilimanjaro there was a very encouraging increase in the use of copper sprays. Widespread trials were laid down in this area under the Three-Year Development Plan in co-operation with the Coffee Research Station and, as the trials include the use of fertilizer, these may have a profound effect on the coffee productivity in the area.

The control of pests and diseases again proved a considerable problem. (On the advice of the Lyamungu staff the use of DDT or Dieldrin was discontinued and replaced by Aldrin.) On Kilimanjaro spraying by teams is probably the ideal answer for efficient control of pests but immense capital sums would be required for the purchase of equipment. In Rungwe District an organized spraying programme was put into effect in three society areas for control of *Antestia* and resulted in an unprecedented demand for a similar service from the other societies. Outbreaks of *Fusarium lateritium* continued to occur in this District resulting, in some cases, in trees being lost; there is as yet no effective control for this disease.

In an effort to improve the quality of Kilimanjaro coffee a "Better Farmers Club" has been formed. Membership is only open to farmers who agree to accept the Ministry's advice. Results so far are encouraging and although the coffee has yet to be auctioned, liquoring tests have shown it to be well above the usual standard. A central pulpery established in Arusha met with some success despite initial managerial problems and once these are smoothed out should do even better. The quality of coffee produced in Mbeya District by African producers continued to improve and there are now 47 coffee washing channels in operation in the District. Mbozi estates obtained some very high prices, one farmer achieving £550 per ton, and others obtaining £470.

(b) *Hard Coffee*

The total production was 6,234 tons of clean coffee as compared with 9,746 tons in 1960. Of this total, 3,847 tons are Robusta and 2,387 tons Arabica. The average price paid to growers of Robusta f.a.q. in Bukoba was £125 per ton (£138 in 1960) and of Arabica f.a.q. £319 per ton (£254 in 1960).

The Bukoba Robusta crop totalled 3,121 tons (5,966 tons in 1960) and the Arabica crop 2,152 tons (2,286 tons in 1960). The Ngara crop of Arabica was again poor and totalled 85 tons (99 tons in 1960).

In Bukoba 534,374 seedlings were issued free by the Bukoba Native Coffee Union, 75 per cent of which were Arabica. The high annual free issue of seedlings is not reflected in any increased production and this may be partly explained by the poor planting methods used. In Ngara some 35,000 seedlings were sold at 15 cents per seedling and it is a significant fact that the standard of management in this area is particularly high. The North Mara coffee area of Lake Region continued to expand and it is now estimated that there are 600 acres planted. The standard of husbandry is good.

The results of spraying against *Antestia* in Ngara, where the pest is prevalent, were not particularly successful, and equipment has been replaced in an effort to improve efficiency. The use of dieldrin against White Stem Borer in West Lake has been disappointingly small. Investigation into control of *Stephanoderes* by chemical means has been discontinued. Long-term trials were laid down in a number of holdings and control will now be sought by improved cultural and sanitation practices.

Owing to the employment of a price support fund in Uganda, the price per pound there continues at a higher level than the initial payment offered by the West Lake co-operatives for Robusta. It is estimated that 1,500 tons may have been smuggled over the border as a result.

Cotton

Although a crop of 200,000 bales in Lake Region was at one time a possibility the chances of achieving that figure became more remote as the growing season progressed. Planting was, for the most part, delayed by the virtual failure of the early rains. In south Sukuma the early dry spell was succeeded by heavy rainfall in March and April, resulting in water-logged conditions in the low-lying areas. In north Sukuma growing conditions were reasonably good after a very delayed start to the rains. In the east Lake conditions tended to be unfavourable for most of the season.

In Biharamulo production was well above the estimate and growers had a very satisfactory season. In Northern Region the crop was badly hit by drought and the total number of bales will be relatively small. In Eastern Region growers concentrated on planting food crops after the failure of the short rains and most growers planted very late. Drought set in shortly after the start of the main rains and much of the crop died off. The baleage will only be a fraction of last years considerable total. Tanga Region had a disastrous year and the crop will amount to a few hundred bales only as compared with the 4,000 bales of 1960.

The total production in 1961 was 167,336 bales of which 157,654 bales came from Lake Region. These figures compare with 188,571 bales and 160,652 in 1960. The Lake production is the third highest achieved. The estimated values of exports of lint, seed cake and oil in 1961 were:—

	£
Lint	6,794,342
Seed	49,915
Seed Cake	415,107
Oil	577

The wastage of seed by growers, particularly in north and south Sukuma has reached alarming proportions and the loss of revenue to the Lint and Seed Marketing Board must be considerable. Broadcasting of seed is practised in two districts of Lake Region and it is known that seed is used in many areas for purposes other than planting, e.g., stock feed. At least one co-operative society is known to be in favour of a system whereby either the grower or the society pays for the seed.

Agricultural staff continued to advise early planting, the use of manure and fertilizer and where necessary, the use of insecticide. Those few growers in the Eastern Region who planted their cotton early and also used insecticide reaped over 1,000 lb. of seed cotton to the acre, instead of the normal 300 lb.

The new wide-mouthed bag for transport of seed cotton was in universal use in all zones of Lake Region with two exceptions; these bags facilitated the rapid movement of cotton and were effective in reducing the amount of extraneous matter, particularly jute and sisal string. The standard of grading in Lake Region showed some improvement over last season. There was a general deterioration in the condition of roads throughout Lake Region and it is apparent that Local Authorities, who derive a large proportion of their income from the cotton crop as a whole, are not utilizing a sufficient proportion of this revenue for the maintenance of roads. If action is not taken in the very near future to improve the state of roads in cotton producing areas there is a possibility of severe dislocation of the industry.

Co-operatives formed in Northern, Tanga and Eastern Regions are rapidly taking over the buying of seed cotton. By the end of next season there will be very few ginneries involved in this side of the business.

The gins at the four new co-operative ginneries in Lake Region are still not proving satisfactory and investigations are proceeding to improve out turn. A new ginnery was opened in June near Kigoma in Western Region.

Pests and diseases were in evidence in parts of the Lake Region but were not particularly severe. A significant increase in the build-up of Pink Bollworm was noted in three zones; the control of this pest is entirely dependant upon the existence of a sufficiently long close season coupled with efficient uprooting and burning. The incidence of American and Spiny Bollworm was comparatively light.

The survey to ascertain the nature and distribution of Fusarium Wilt, started in 1959 was again carried out with particular attention to details. There was a substantial spread of the disease from the lake shore to inland areas as far east as the main Geita East/West Road and to the east of Smith Sound.

Demands for seed for the 1961/62 seasons planting were again high and 12,000 tons were distributed in Lake Region.

Cashew Nuts

In Southern Region, the main growing area, there was a heavy flowering, later than usual, and a marked decrease in *Helopeltis* attack. Nuts were correspondingly late in coming forward and it was October before any quantity was offered. Unusual heavy rains started at the beginning of the same month and brought on a heavy growth of weeds, the picking up of nuts became difficult, and the quality of the produce offered, when the main buying season opened at the end of the month, was indifferent. The rains continued unabated into December and much of the flower failed to set. Nuts remaining on the trees deteriorated rapidly in condition owing to the excessive moisture. The story in Eastern Region was very similar but the damage done was probably proportionately more severe.

The crop was disappointingly small, especially after the early optimistic estimates, and totalled 28,579 tons of which 25,933 tons came from Southern Region. This is little more than half the 1960 crop. The total value to the grower was about £857,370.

Low prices were offered initially as not only was quality poor but there was considerable doubt as to whether processing firms in India, reported as holding large stocks, would buy any of the crop. After a few uncertain weeks it became clear that Indian processors were interested and prices stabilized in the region of 60 cents per kilo for best quality nuts delivered at Mtwara and as low as 40 cents for wet nuts. Masasi, Nachingwea and west Newala producing nuts of reasonable quality. In Eastern Region prices ranged from 20 cents per kilo for wet nuts to 55 cents for better quality nuts.

In Southern Region co-operative societies and farmers' associations took part in cashew buying for the first time and did so with a fair measure of success. The co-operatives handled some 2,300 tons and farmers' associations 1,700 tons. There are, as yet, no co-operatives in Eastern Region which engage in cashew marketing.

The cashew cess remained at 5 cents per kilo in both Southern and Eastern Regions. A sum of approximately £99,000 in cess was collected at Southern Region ports.

Two processing plants continued to function in Dar es Salaam but the plant at Mahurunga (Mtwara) did not operate during the 1961 season.

Cassava and Sweet Potatoes

As usually happens in a year of unsatisfactory weather conditions and consequent food shortages, interest in both these crops revived and there were considerable plantings in most regions. Existing plantings of cassava were nothing like sufficient in the areas where food was short but were still extremely useful. Growers in Southern Region had a brisk demand for their cassava throughout the year from Europe as the Congo and Angola supplies were severely curtailed by political troubles. Prices remained high at 22 cents per kilo. The crop was in excess of 14,000 tons. The total value to the grower was about £161,029. The export demand, unlike 1960 was mainly for flour, and mills in Mtwara were kept extremely busy.

Coconuts, Copra and Coir

Copra production continued to be considerably less than former years and shows little sign of a revival. The prices being offered in Tanga Region were poor, between £30–40 per ton and in Eastern Region prices were even less. Growers are turning their attention to the fresh nut trade where the prices are good and no preparation is required. Production of copra is estimated at 8,692 tons valued at £328,423. Some success was achieved in the formation of co-operatives to market copra in Tanga Region.

Despite a fall in price to £31 per ton, coir production remained fairly steady. There are five factories functioning in Tanga and two in Eastern Region.

In order to encourage the replacement of aged palms the number of nurseries has been increased by the Agricultural Department in all three coastal regions. The coconut/cattle scheme established last year whereby the controlled grazing of cattle is encouraged in coconut plantations proved extremely popular and has been extended.

Maize, Sorghum and Millets

(a) *Maize*

With the exception of Western Region and the North Mara District of Lake which had fair crops, the maize crop generally was very poor. The Northern Region was particularly badly hit, the marketable surplus, usually between 18,000 and 26,000 tons, will amount to little more than 4,000 tons. The crop in Southern Highlands although less than usual still allowed a reasonable surplus for export out of the region. Good prices were obtained in most areas and at one time in Southern Region reached £25 per ton. The total marketed amounted to 50,386 tons valued at £776,399 as compared with 77,946 tons valued at £857,406 in 1960.

(b) *Sorghum*

This crop continued to lose popularity and in the near future will probably be used for beer making only. The crop in Western Region was good but very poor elsewhere and suffered extensively from the depredations of the Sudan Dioch.

(c) *Finger Millet*

Finger Millet (*Eleusine*) is rapidly gaining popularity in the North Mara District where total sales amounted to 6,069 tons. Although still extensively grown in Ufipa it is tending to lose ground to wheat. The total production is estimated at 11,329 tons.

Oil Seeds

(a) *Castor*

Castor is mainly produced in the Central Region and in common with other crops in that area production was severely curtailed by drought, it was, however, probably less affected than the others and the final tonnage was better than expected. In Eastern Region production was also down on the 1960 total, but not drastically so. Elsewhere there was little interest shown in the crop. Production amounted to some 12,000 tons.

(b) *Groundnuts*

Production of groundnuts in Central Region, where the crop is of considerable importance, was drastically reduced by adverse weather conditions. Even supplies of seed for the 1962 season may be insufficient but there has been a natural reluctance on the part of growers to introduce seed from elsewhere as the "Dodoma Bold" quality nut is peculiar to the region. Production in other areas was less than last year with the exception of Southern Region where conditions were ideal for the crop. The total production marketed amounted to 8,784 tons valued at £436,778.

The Mwitunde is now accepted by the trade in Southern Region but is still not popular elsewhere. Prices generally were less than in 1960.

(c) *Sesame*

There was a slight decrease in Southern Region production owing to a combination of adverse weather conditions at a critical stage and to flea-beetle attack. The "Morada" variety is now introduced to all regions except Northern and West Lake, it is particularly popular in the Eastern and Western Regions. The marketed production amounted to some 12,000 tons. Prices were good in all producing areas. There is a marked reluctance on the part of growers and traders in the south to pay attention to the amount of extraneous matter in sesame being offered for export. Most of the 1961 crop was exported to Genoa, Leghorn and Tunis with a small amount to Cyprus.

(d) *Sunflower*

Production in Southern and Eastern Regions was double that of 1960, largely because of the better prices offered. There was a fair crop only in Western Region, elsewhere the crop is only of minor importance. The total marketed amounted to some 12,000 tons. The good prices received in 1960 were maintained.

(e) *Mafura Nut* (*Trichilia emetica*)

Interest in this crop was shown by the trade in Rhodesia and in Mozambique and production increased to 550 tons. A proportion of this total is used locally in a soap works. The crop is produced from indigenous trees and production expands and contracts according to demand.

Paddy

Notwithstanding the poor prices of 1960, extensive acreages were planted to paddy. Early plantings in Eastern Region were badly damaged by Army Worm and later sowings were affected by drought. Despite lack of flooding however, Rufiji produced a crop of 5,000 tons. Lack of rain early in the season affected the Western Region crop and fields were poor; Tanga was in much the same position. Southern Region produced a good crop.

Prices were high throughout the season, between 25 and 30 cents per lb. for the better varieties and 22,927 tons were marketed worth £696,113 to growers, a considerable decrease on the tonnage marketed in 1960 which amounted to 34,859 tons valued at £714,609.

Small premiums continued to be offered for good samples of Kahogo, Demarara, Creole, Afaa and a variety specially imported for mechanical cultivation, Surinam.

Prospects for 1962 are again poor as most of the areas favoured for the crop were under water for the last few months of 1961 and planting was not possible. Imports from the Far East have been suspended for some time and if local supplies are short, prices will inevitably rise.

Pulses

The Northern Region pulse crop offered for sale is normally far in excess of any other Region but in 1961 only about a tenth of the 1960 figure found a way to the markets so extensive was drought damage. With the exception of Southern, West Lake and Lake Regions other growing areas had, on the whole, a poorish season.

An excellent crop of Chickpea was produced in Lake Region amounting to 2,445 tons (500 tons in 1960). Prices varied from 23–29 cents per lb. The mixed bean crop in West Lake again achieved very low prices, in the region of 10 cents per lb. The main bean crop in the Matengos was extremely good and 300 tons were offered for sale. In Arusha there was a further decline in the small production of Haricot Beans but it is hoped that with the isolation of new strains at the Research Centre at Tengeru, a valuable industry might be built up. Soya Bean continues to be grown mainly by the Tanganyika Agricultural Corporation at Nachingwea but it is encouraging to note that African farmers in Masasi, Lindi, Newala, and parts of Nachingwea District are beginning to show interest in the crop. Efforts to popularise the growing of Soya in Bukoba have not met with success. There was an increased interest in the growing of Cowpea in Western Region.

Pyrethrum

Pyrethrum is rapidly becoming a crop of major importance in the Southern Highlands where suitable land is more readily available than in the Northern Region, the other main producing area. In Southern Highlands production of dried flowers has increased from 457 tons in 1960 to 634 tons in 1961. African farmers accounted for some 400 tons which is a remarkable increase when it is considered that the increased productivity scheme was launched in 1957 when 9 tons were produced. Northern Region has also shown a remarkable increase in production and the 553 tons of 1960 has increased to 650 tons in 1961 of which African farmers produced 41 tons compared with 9 tons which they produced in 1960.

In Southern Highlands, the main producing area continues to be Njombe but production in the Iringa and Mbeya areas is increasing rapidly. Five new areas were opened in the region during the year. In the Northern Region production is mainly centred around Arusha but development is taking place also in Moshi and Mbulu Districts.

The Department continued to assist with the supply of planting material and seed. A supply of clonal material was bulked up in the Southern Highlands and the first issue made to growers.

The pyrethrin content has varied from 1·02 to 1·66 per cent with an average of 1·3 per cent and the price remained for most of the year at 3/- per pound for flowers having a 1·5 per cent pyrethrin content. The entire crop continued to be processed by the East African Extract Corporation.

Remularia bud disease was detected from time to time in both areas, Thrips and Red Spider Mite also gave some trouble.

Seed Beans and Seed Peas

(a) *Seed Beans*

1961 was a disastrous year for the Northern Region seed bean industry. Drought created havoc in nearly every growing area and many thousands of acres produced little or nothing. The crop amounted to 1,941 tons only. The acreage planted was 38,500 which was some 200 acres more than in 1960 when a record crop of 5,021 tons was produced.

A much smaller acreage was sprayed against Boll Worm largely because growers had given up hope of getting a crop by the time spraying became necessary. Diseases were of little importance.

The voluntary certification scheme operated by the Plant Pathologist, Tengeru, gave complete satisfaction and it has become a compulsory scheme at the request of the Seeds Board, the necessary legislation was introduced at the end of the year. A seed company in the United Kingdom has expressed interest in the growing of seed beans in Southern Highlands and samples of a number of varieties are being supplied for trials.

(b) *Seed Peas*

Weather conditions in Southern Highlands were against high production of the seed pea crop, being too dry during the period of early growth and much too wet later on. The crop amounted to 350 tons which was very much smaller than had, at one time, been hoped for. Members of the Ministry's staff spent three months roguing and inspecting the crop in the field. Seed houses have been very satisfied with the quality of the crop. Samples of all consignments are tested for germination at Tengeru and so far tests have revealed 97 to 100 per cent germination. The price paid to growers was guaranteed at Shs. 65/- per 1 cwt. bag.

Disease was more prevalent than in previous years owing to the wet conditions in the latter part of the season. Leaf and pod spot, *Micosphaerela Blight* and powdery and downy mildews were evident.

Sugar

Total production of white sugar has amounted to 28,719 tons as compared with 28,624 tons in 1960. The bulk of this production came from Tanganyika Planting Company estate near Moshi which produced 24,236 tons. Production at Kagera (Bukoba) increased from 1,661 tons in 1960 to 2,006 tons in 1961.

Development of the Kilombero Sugar Company's estate has proceeded rapidly. Some 1,700 acres of commercial cane have been planted and an overhead irrigation system has been installed. The cane is growing well and high yields can be expected. The factory is rapidly taking shape and staff quarters and labour lines have been completed. The estate in the Ruvu Valley now has 900 acres under cane and the factory produced a small amount of sugar in the last two months of the year. The Mtibwa Estate at Turiani is still without a factory.

The production of jaggery has continued in the Eastern Region (2,000 tons) and to a lesser extent in Tanga Region.

Tea

In the Usambaras conditions were extremely unfavourable in the early part of the year and on three estates bushes were dying from the effect of drought. Later in the year rainfall was ample but temperatures were unusually low and growth was retarded. The final production figure showed an increase on 1960 (3,192,448 lb. in 1960 of made-tea compared with 3,998,323 lb. in 1961). In Southern Highlands the low yields which were evident at the end of 1960 owing to unfavourable weather conditions persisted into 1961. With the improvement in the weather conditions in the latter half of 1961, there was a welcome increase in yields. Production showed an increase over 1960 (5,003,750 lb. in 1960 of made-tea, compared with 5,831,638 lb. in 1961). The total production of 9,829,961 lb. of made-tea was valued at £1,965,992.

The first recorded harvest from Njombe amounted to 6,000 lb. of made-tea. New factories under construction at Lupembe and Uwemba in Njombe District were completed and will be in production in 1962. Two African tea growing schemes initiated in Southern Highlands and another in the Usambaras will be dealt with more fully in Section V. Preparations for African grown tea have gone ahead at Bukoba and a nursery near Maruku should supply sufficient stumps to plant up 200 acres of tea in mid-1963.

Tobacco

1961 was on the whole a good year for tobacco growers. The Songea fire-cured crop was the highest since 1950. Western Region growers of flue-cured had a good year but Southern Highlands growers, although they did not fare quite so well still had a reasonable crop. The Nyamirembe fire-cured crop showed an increase on 1960 but competition from the coil trade was intense and the crop marketed with the Board was disappointing. A number of cultural difficulties remain to be straightened out in the growing of Turkish tobacco and the quantity and quality of the crop were below expectations.

Production figures and values of flue-cured and Turkish are given below. The fire-cured figures for various reasons are not comparable and have been excluded.

	1961		1960	
	lb.	£	lb.	£
Flue-cured ...	3,635,613 ...	475,293 ...	3,970,536 ...	524,730
Turkish ...	34,561 ...	4,142 ...	14,800 ...	1,480

(a) *Flue-cured*

In Iringa the late onset of the rains delayed planting and a dry spell early in the year was anything but helpful. There was a continued improvement in seed bed management, but the planting, reaping and grading operations leave much room for improvement. The total crop at 2,322,880 did not reach the district quota of 2·7 million pounds. Leaf was bought for the first time by the firm of Edwards, Goodwin acting as agents for the East African Tobacco Co. At an average price of Shs. 2/41 per pound the crop was valued at £282,110. The quota for 1962 remains at 2·7 million pounds.

At Lupatingatinga in Chunya, the Tanganyika Agricultural Corporation Tenant Scheme had a total of ten growers who produced a crop of 54,067 lb. of leaf of variable quality. The number of tenants for 1962 has been increased by thirty.

In the Western Region the Tanganyika Agricultural Corporation tenants at Urambo had another good year and produced a crop of 1,162,589 lb. of cured leaf valued at £175,626. Despite the fact that some of the estate owners left the area, the remaining farmers made good the loss and the high production of 1960 was maintained. The co-operation of the growers in enforcing a closed season, as a protection against disease, was excellent.

The master growers at Tumbi, in the scheme run in association with the East African Tobacco Co., had a reasonable season but not as good as in 1960. The crop totalled 136,264 lb. at an average price of Shs. 2/37 per lb. which is a decrease of 68 cents per pound on the 1960 price. The average cash return to the master grower was Shs. 1,343/- per acre which compares unfavourably with the 1960 figure of Shs. 2,006/- per acre. There was a small amount only of green leaf offered for sale and it is hoped that next season all growers will cure their own leaf.

(b) *Fire-cured*

The Songea growers had a very successful year and produced a crop of 2,136,960 lb. the highest since 1950. Grading was much higher than usual, over 40 per cent of the crop attained Grade I, whereas in 1960 the comparable figure was only 9·53 per cent. There has been a significant increase in the number of curing barns built to deal with the 1962 crop and this should reduce considerably the amount of tobacco downgraded because of mould and rotting prior to curing.

The Nyamirembe Tobacco Board bought 60 tons of cured leaf valued at £6,035 as compared with 23 tons valued at £2,272 in 1960. The Board again operated at a loss largely because much of the poorer quality leaf is sold privately as coil tobacco, and the high prices paid for the better grades tend to be out of proportion. The standard of grading was poor, and it is hoped that with the resumption of the buying and management operations by the Board, and the consequent release of Departmental staff, there will be a distinct improvement of grading in the field.

(c) *Coil*

No accurate production figures are available but it is estimated that in the area covered by the Nyamirembe Board a total of over 300 tons of coil tobacco was sold privately. Prices again ranged, as in 1960, from Sh. 1/- to Shs. 8/- per lb. The coil trade is carried on in several other parts of Tanganyika, but on a very much smaller scale than in the Western and West Lake Regions which are the areas covered by the Board.

(d) *Turkish*

Turkish tobacco was grown commercially in three Regions in 1961. Results were disappointing owing to adverse conditions and the lack of experience in the growing and preparing of the crop by the growers. Western Region produced a crop of 24,023 lb. which sold at an average price of Shs. 2/43 per lb. The Southern Highlands crop was poor and amounted to 4,193 lb. at an average price of Shs. 2/50 per lb. In Central Region 6,345 lb. was marketed at an average price of Shs. 2/15 per lb., the results in this region were very promising. The entire crop was bought by the representative of a Southern Rhodesian firm.

Wattle

The Tanganyika Wattle Co. produced, at their Njombe factory, a total of 6,326 tons of extract. The price averaged £40 per ton f.o.b. The Company agreed to buy up to 400 tons of stick bark from African smallholders at £5 per ton, but the amount offered for sale fell short of this mark. In the Usambaras there was considerable delay in the erection of the new extract factory and production was limited to 500 tons of extract.

Wheat

The total production was 5,444 tons worth £146,433 to growers as compared with 11,660 tons valued at £320,650 in 1960.

The Northern Region crop was drastically reduced by a combination of drought and Army Worm. A few growers in favoured areas harvested good crops but generally speaking yields were low and in some cases the crop was a total loss. Little was seen of stem rust because of the dry conditions.

Wheat is becoming increasingly popular as a food in the Songea area at the expense of maize. Production is estimated at 500 tons but little of this appears on the markets. The growing of wheat is being encouraged in Western Region as a cash crop alternative to finger millet. The latter crop is a major one in the region but has been subject of late to several falls in price.

SECTION IV

Minor Crops

The crops in this section vary considerably in importance, one or two such as bananas have considerable value as a food crop but most play only a small role in the country's economy.

Barley

The small production in Northern and Southern Highlands Regions was maintained, and most of it utilized as a pig food by local breeders.

Betel Nuts

Production on the Pangani River dropped to 90 tons from 140 tons in 1960. The decrease in production was largely due to adverse weather conditions.

Chillies

The season in Northern Region, where the crop is grown under irrigation, was generally successful for the growers. Production was in the region of 120 tons and the price was well maintained at Shs. 30/- to Shs. 40/- per *frasila* (36 lb.) for large and Shs. 60/- to Shs. 65/- for small types. Seed of reputed virus-resistant strains was obtained from Central and South America and, after being screened at Tengeru for desirable types, the selected seed will be tested in field trials.

Cocoa

Over 16,000 seedlings of the Pemba variety of *Forastero* were sold in Tanga Region. Existing plots vary considerably in the standard of maintenance, and it becomes increasingly obvious that the rate of survival is directly proportionate to the amount of care taken in planting and subsequent cultural operations. An Upper Amazon type of seed was flown in from Nigeria at the end of the year and planted in a newly prepared nursery. This type of seed is quicker growing than the *Pemba Forastero*. Trials to establish the best cultural methods for cocoa have continued in Tanga, Eastern and Southern Highlands Regions. In the latter region, 1,000 plants were distributed to growers but, owing to a combinations of factors, more than half of this total failed to establish. A further 10,000 seedlings are now in nurseries for distribution early in 1962 in the region.

Essential Oils

Production on an estate in Tanga Region of bitter orange oil fell to 8,000 lb. valued at £750 from 9,500 lb. valued at £7,000 in 1960. The fall in production was entirely due to a fall in demand, in favour of oil from Jamaica, which is stated to be superior. Seed has been imported from Jamaica by the estate owner in the hope of improving the existing strain. Production of geranium and eucalyptus oils was continued at Uwemba in Njombe District.

European Potatoes

There was a slight fall in the tonnage marketed from the Southern Highlands Region, from 1,940 tons in 1960 to 1,370 tons in 1961. The bulk of this crop comes from Mporotos near Mbeya where methods leave much room for improvement, in that the larger potatoes only are harvested, and the smaller ones allowed to "volunteer" for the following season. Under these conditions blight is of course rife. The tonnage marketed in the Northern Region amounted to 800 tons. On account of heavy attack of blight in the Tanga Region, the 1961 crop amounted to 280 tons only. As a result of the heavy attacks experienced, some seed of blight resistant varieties was imported from Kenya.

Fruits

Bananas continued to be the most important of the fruit crops grown in Tanganyika, and particularly so in a year of food shortage. Citrus continues to occupy a high place among other fruits grown, although weather conditions were against a big crop.

Tanga Region again exported 2,000 tons of bananas mainly to Kenya. Supplies in Northern Region were short in the middle and later part of the year, following the drought, and prices rose sharply; in Moshi the price rose to Shs. 15/- per bunch for certain brewing types. Exports to Lake ports from the Ukerewe Island amounted to 1,000 tons. Close on 600 tons of the crop was exported from Bukoba by lake, and an unknown tonnage went out by road. In Tanga Region the Horticultural Officer is making a banana collection and two varieties said to be Jamaica A and B have been found much superior to the dwarf Cavendish, generally accepted as the best fruit. Multiplication of these two varieties is being speeded up so that distributions can be made.

Citrus and Other Fruits

Ukerewe, one of the more important citrus areas, exported 780 tons of fruit to Mwanza and other ports on the Lake. Tanga Region had a poor year and only 400 tons of citrus were marketed, this is the lowest crop on record for 15 years. Exports from Tanga are still mainly to Kenya although the demand is falling off as that country's new plantings come into bearing. Kisarawe continued to supply the bulk of Dar es Salaam's citrus requirements.

In Southern Region the target of 40,000 lime trees, aimed at by Rose & Co. the lime juice manufacturers for their factory, was achieved. Some 10,000 trees are now in the third and fourth year of growth and 20,000 in the second year. The pilot extraction plant was partly assembled and the remaining material and machinery are now on the site. If sufficient fruit is available it is hoped to start production of lime juice in 1963/64.

In the Western Region there was again a good crop of mangoes and consignments were sent by rail to Mwanza and down to Dar es Salaam and intermediate stations on the central line.

Pineapples grown near Tanga and Dar es Salaam continued to find a ready market.

Temperate fruits such as plums and pears are grown in small quantities only in Tanga and Southern Highlands Regions and are mainly sold locally.

Gums

In Central Region strenuous efforts were made to collect a good gum arabic crop, so poor were the other cash crops. Collectors efforts were highly successful and resulted in a record crop of over 400 tons. The collection of gum arabic in Sukumaland south was on a reduced scale at 250 tons compared with the 655 tons of 1960. Collection in the Western Region was also considerably reduced, mainly because of the poor prices offered.

Kapok

The marketed crop of 946 tons was very small, and at the uneconomic price of 20–40 cents per lb. much of the crop remained unharvested.

Kenaf (*Hibiscus fibre*)

This crop is still under observation and results obtained under irrigation at Mlali near Morogoro were most encouraging. Because of drought conditions trials in the Northern Region largely failed.

Onions and Garlic

The dry conditions in Northern Region favoured thrips attack and damage was considerable, causing the crop to fall well below the 1960 figure. The Central Region crop was also considerably reduced from the previous year. The Eastern Region crop was extremely good. The marketed crop amounted to 6,637 tons at prices varying from £35 to £50 per ton. Onion growing continues to become more popular and over 1½ tons of seed was imported by the Department from India during the year. There was again an increase in the production of garlic in Mbulu to 25 tons in 1960. A total of 100 tons was marketed in the Northern Region.

Palm Oil and Palm Kernels

There was a small expansion in the Kigoma industry with the distribution of seedlings from a Local Authority nursery. Prices were 87 cents per lb. for oil and 24 cents per lb. for kernels. Crop production amounted to approximately 800 tons of kernels and 60 of oil. From Tanga Region 50 tons of oil and 40 tons of kernels were produced. Interest in the crop has revived in Lake Nyasa area of Rungwe and the Plant Physiologist visited the area to advise on the type of palm to be planted. In Southern Region nurseries were prepared and planted with a target of 40,000 seedlings for distribution in the Lake shore area of Songea.

Papain

A replanting programme in the Northern Region was stimulated by a slow upward swing in prices. This upward swing was brought about, it is thought, by the complete exhaustion of the Congo plantations and to reduced production in Ceylon. Production amounted to 65 tons valued at £146,720. A drier designed and produced by the Officer-in-Charge, Tanganyika Agricultural Machinery Testing Unit is at present under trial to ascertain if in fact the papain produced is of better quality than that produced by an older type of drier.

Rubber

A Colonial Development Corporation adviser on rubber visited potential areas of production in the Kiberege/Kilombero area. Parliament approved his report and encouraged its implementation. Some 5,000 rubber seedlings were grown in a nursery in the same area in anticipation of further development. The only existing estate is situated near the Kilombero Valley and its rather aged trees were given a new lease of producing life when the owner was advised to combine base with high tapping. Production was maintained in the region of 40 tons.

Cinchona

Interest was again being shown in this crop as the price improved. The revival was due to the stock pile in the U.S.A. having been sold off and the increased use of quinine in soft drinks. Production in Tanga Region amounted to 100 tons.

Vegetables

Vegetable growing continued on a big scale in the Ulugurus (465 tons), Usambaras (720 tons) and Southern Highlands (540 tons).

The growing of vegetables for local consumption is on the increase in Northern Region. Interest in vegetable production in Bukoba and Karagwe Districts continued to increase, and some 1,600 packets of seed were sold through the Departmental field staff.

SECTION V

Three-Year Development Plan

A number of the Increased Productivity Schemes detailed in the 1960 Report have been absorbed into the routine work of the Department; a number of others, notably tea development, have become part of the Three-Year Development Plan. The Plan as it affects the Agriculture Department can be divided into seven main groups of projects as follows:—

(1) Agricultural Training.
(2) Extension Services.
(3) Specialist Services.
(4) Research Services.
(5) Agricultural Subsidies.
(6) Farm Institutes.
(7) Agricultural College.

The Plan did not come into operation until July, 1961, and in the six month period under review, July–December, a considerable amount of ground work was done with the exception of Item 5 which has been deferred temporarily for reasons of shortage of staff.

(1) *Agricultural Training.* In this field, work started on an expanded building programme at the Agricultural Training Centre, Ukiriguru, and the Land Planning Training Centre, Morogoro. A site selected for the Animal Training Centre at Urambo was surveyed preparatory to deciding on the layout.

(2) *Extension Services.* Recruitment was started to fill the additional posts made available, but with little success at the higher levels. Funds were made available to order a considerable volume of transport and equipment, all of which will be necessary to enable the increased staff to carry out their duties. Equipment such as engines, nets and a trailer tanker were ordered for fisheries activities. Work was started on the establishment of animal drought training centres in Southern Highlands, Tanga, Eastern, Southern, Central and Lake Regions. As an aid to the improvement of crop husbandry standards, demonstration equipment was purchased such as spray pumps, winnowing machines and insecticides.

There was considerable activity in connection with tea development. Nurseries were established at Vugiri (Usambaras), Rungwe, Lupembe and at Bukoba. Stumps from these nurseries will be sufficient to plant approximately 300 acres in 2–3 years time. In order to reduce this time lag, stumps were obtained from other sources for planting in the field at Lupembe (202,000 stumps sufficient for 60 acres) and in the Usambaras (37,000 stumps sufficient for 10 acres). Discussions reached an advanced stage as to what form a green leaf agreement, to be negotiated between producers and estates with factories, should take. The intention at Bukoba is that a nucleus estate and factory should be established by a commercial company with financial help from the Colonial Development Corporation. It is hoped that the Bukoba Native Co-operative Union and the Buhaya Council will also participate. A suitable piece of land was selected near Maruku and preliminary discussions took place. Four officers with a specialist knowledge of tea joined the Department during the year.

Much of the money allocated to grazing schemes was used to employ labour to clear bush in the famine stricken areas of Central Region. The work is described in Section IX of this Report.

Funds for the improvement of plantation crops were utilized to establish cocoa, palm oil, coconut and rubber nurseries. Two small mobile irrigation units were formed in the Eastern and Tanga Regions with the object of helping to establish minor irrigation schemes and to assist in achieving the more effective use of water by simple improvements to channels, offtakes, etc. In order to improve extension methods, cameras and projectors were purchased and distributed to regions with the object of building up libraries of transparencies and giving film shows on safari, both projects being aimed at improving crop husbandry methods.

(3) *Specialist Services.* Building commenced at the four main research centres to provide additional facilities in storage, drawing office accommodation and housing. Six senior officers were engaged during the year as well as ancillary staff on land planning work. The first steps were taken to expand land planning services on a regional basis rather than the present system with only four Land Planning areas to cover the whole country. A large programme of survey, both reconnaisance and detailed, was undertaken for crop expansion and settlement schemes. Additional equipment was bought so that the testing facilities of the Tanganyika Agricultural Machinery Testing Unit could be extended. In order to ensure greater control of pests and diseases which may be present in produce being imported into the country, a start was made to setting up inspection facilities at ten important points of entry, to supplement the present services at Dar es Salaam and Tanga.

(4) *Research Services.* A start was made to the developing of a Horticultural Research Section with sub-stations ranging from Muheza to Amani in Tanga Region. The work to be undertaken will cover the improved production of fruit and vegetables.

Plans to improve laboratory and housing facilties for all grades of staff at Research Centres and sub-stations were made to be implemented early in 1962. New and improved equipment was purchased to improve laboratory and field techniques.

(5) *Agricultural Subsidies* are, as already mentioned, deferred temporarily.

(6) *Farm Institutes.* Plans were made to establish three farm institutes. The first of these, and the most advanced, is at Msinga near Moshi. The farm has been laid out and building will start early in 1962. It is anticipated that the institute will be completed by October, 1962. The second institute will be at Seatondale, near Iringa. There were a number of delays over the acquisition of the land but, by the end of 1961, the position was virtually settled and building was expected to start early in 1962 and be completed by early November. The third institute will be established at Malya in Sukumaland. This institute has not been given the same priority rating as the other two but building will commence in mid-1962 and should be completed by early 1963.

(7) *Agricultural College.* A site was selected at Morogoro for the establishment of an agricultural college. Building is scheduled to start in September, 1962 and the first intake of students will take place, it is hoped, in October, 1963. A visit was made during the year to the site by the Dean and two professors of the University of West Virginia. This university will be closely allied with the College project, and it is the intention that it will provide five members of the teaching staff.

SECTION VI

Vermin and General Pests

Khapra Beetle (*Trogoderma Granarium*). The Produce Inspection Service dealt with 335 ships in Dar es Salaam alone and *Trogoderma* was found in the cargo of 75 of them which necessitated the fumigation of part of the cargo. The beetle was found in 15 stores out of 180 inspected. Regular inspections of the Princess Margaret Quay Lighterage and Dhow Wharves were also carried out. There was an extensive outbreak of the pest in Southern Region at Lindi, Mtwara, Tunduru and Songea. It took two months to regain control and during that time 30,000 bags of mixed produce were fumigated and 35 stores disinfested. In Eastern Region an outbreak at Kilosa was controlled by Departmental staff aided by the fumigation company. A small outbreak in Dodoma was controlled promptly.

Sudan Dioch (*Quelea*). The provision of increased funds made it possible for control teams to destroy roosts and breeding areas wherever these could be found instead of, as in former years, concentrating only on nesting sites and roosts in the immediate vicinity of growing wheat. Even allowing for the effect of the severe drought in Northern and Central Regions, it would seem reasonable, judging by the fewer nesting sites discovered in 1961 and the smaller size of the colonies, to claim, that the five-year battle against the Dioch is at last showing results. Provided the assault is maintained over the next two years, striking at birds in areas which hitherto were out of range, it is a definite possibility that the Dioch will have been reduced to a stage where it will no longer constitute a threat. As a result of spraying from the air, and the use of flame-throwers and explosives, it is estimated that a total of 58 million birds were destroyed.

Ringing continued in the Dodoma area and 5,473 birds were ringed during the year. Recoveries were made in many parts of the Western, Central and Eastern Regions with a particularly large number from Kilosa District. It may be possible to extend operations to the latter area next season.

Rats and Otters. The Zoologist continued his investigations into methods of controlling giant rats and otters in Songea District. It is his opinion that the otter is not a serious problem and that no special control measures are necessary. The giant rat however, is a serious menace, and it was found that the best results were obtained by using a trap of American make; a large order for these traps was made.

Pigs, Porcupine and Baboon. The Vermin Control Service in Lake Region had another successful year. Large numbers of baboon, pigs and porcupine were destroyed along with a number of hyena. Methods of controlling vermin other than in Lake Region tend to be haphazard or absent. One of the schemes in the Three-Year Development Plan is to set up a mobile team to demonstrate and encourage methods of vermin destruction.

Prickly Pear. The campaign for the control of prickly pear by the spreading of a scale *Dactylopius tomentosus* was continued and the results are encouraging, particularly in the east of the Lake Region.

Water Hyacinth (*Eichornia Crassipes*). Spraying against water hyacinth continued along 38 miles of the Pangani River. It seems to be almost impossible to eradicate this weed by spraying methods, all that can be hoped for is to maintain control.

Locusts. There were several warnings from the control organizations that an invasion might be imminent, but fortunately the threats did not materialize.

Other pests and diseases are mentioned under the headings of the crops.

The Produce Inspector, Dar es Salaam, issued 568 Plant Importation Permits and 31 Phytosanitary Certificates.

SECTION VII

Land Planning, Soil and Water Conservation and Land Usage Schemes

Land Planning Units continued to operate at Tengeru and Ukiriguru but the unit continued to operate at Tengeru and Ukiriguru but the unit which formerly operated at Iringa is now established at the Central Research Centre, Ilonga. The Land Planning Training Centre at Morogoro continued to train prospective Junior Survey Assistants as well as holding a number of in-training and promotional courses.

Northern Region Land Planning Unit

Final plans for the settlement schemes at Modege and Kitete in Mbulu District were worked out. Grazing schemes were mapped and laid out on the ground at Wigenzele and Hombolo in Central Region. Reconnaissance surveys were carried out at Bubu Valley, Central Region (for irrigation), at Gonja, Same District (for irrigation), at Lolkisale, Masai District (for a pilot grazing scheme) and at Matangoro, Kongwa District (for a grazing scheme). Soil conservation works to protect the projected Mlowa Dam in Dodoma District, were designed and laid out. 18 Topographical surveys were also undertaken and completed.

Central Region Land Planning Unit

The Unit surveyed and planned a considerable area of the Elton Plateau for a soil conservation layout. A Junior Survey Assistant from the Unit was detached to work on the settlement scheme at Sonjo in the Kilombero where the layout was planned by the Officer-in-Charge, Land Planning Training Centre, Morogoro. A contour map was made of the tobacco area at Lupatingatinga in Chunya District and holdings laid out under the supervision of the Tanganyika Agricultural Corporation. A large scale contour survey, followed by a detailed survey and planning of the layout were completed on the Lupembe Tea Scheme. A topographical map was completed for the Ichondo Settlement Scheme in the Kilombero Valley.

Western Region Land Planning Unit

The conservation layout of the Agricultural Training Centre was completed successfully by the Unit. The Western Research Centre layout was partially implemented only, as a number of modifications have been necessitated by the considerable building programme. Conservation measures were successfully implemented on two sub-stations in the Western Region. Detailed land usage plans were prepared for Nyegezi Mission, Kazima Training School for the Blind and a very considerable undertaking at Maruku for the projected tea scheme.

Land Planning Training Centre, Morogoro

An account of the work carried out at Morogoro is given in Section XI of this report.

Mechanical Services

Two units of the Mechanical Services in Northern Region were kept fully occupied until early June, but by then the effects of the drought had begun to be felt and many farmers found they had insufficient money to employ the units. This was most unfortunate as, with five new tractors, the service was in a position to work with greatly improved efficiency. The new tractors had already begun to prove their worth as shown by the reduction in the time taken per acre for terracing, on all slopes, from 4.15 to 2.25 hours. During the operational season which was from June 1960 to June 1961, 1,033 acres were terraced, 17,000 ft. of diversion ditches and waterways cut, 666 hours were spent on various road works and two small dams were built.

Farm Planning

The services of the Agricultural Officer, Farms and Estates, in Northern Region have continued to be in great demand. Eight farms were mapped during the year, five of these were planned, and there are nineteen requests outstanding for planning. There is a welcome move by the farmers towards an organized arable rotation incorporating a period of rest for the soil under a grass cover. Planning of farms in other regions is slowly gaining in popularity, particularly in Southern Region. Staff continue to be trained at the Land Planning Centre, Morogoro, for this type of work, and there are ever increasing demands for their services.

Settlement Schemes

The work involved in choosing, planning, advising, and in some cases supervising and servicing farm settlements, is taking up an ever increasing proportion of the time and energies of the field staff. The planning of the settlement schemes of Sonjo and Ichonde in Ulanga continued to be a Departmental responsibility. By the end of July, when some 240 acres were cleared, it became obvious that hand clearing was a very slow and costly operation and it was decided to disperse the labour force and arrange for mechanical clearing on contract. Two contractors were engaged, one for clearing, the other for ploughing and harrowing. Progress was hampered by extremely heavy unseasonal rains. Coincident with the clearing programme the Land Planning Services mapped the area and prepared a land plan which provided for 80 holdings of 5 acres each. It is proposed that each farmer will plant 1½ acres of sugar cane as his main cash crop and sell the cane to the Kilombero Sugar Co., the rest of the holding will be planted to food crops. At Ichonde a loan to assist the group of farmers settled there with the ploughing and cultivation of their land was granted. At the request of the settlers a land plan for the development of the area to accommodate up to a total of 80 farmers is being prepared. Some fifty members of the Sonjo labour force who elected to stay in Ulanga after the clearing project closed down, were settled at Kichangani. They intend to grow paddy as a main crop, and have applied for a loan to plough and seed an area of 100 acres.

In the Tamota area of Handeni 90 people each took up one of the 10-acre plots which had been laid out. A Field Assistant was posted to the area and farmers were given all assistance possible.

In Northern Region all 50 holdings of the Makuyuni area were occupied by the end of June. The settlement had a very unfortunate first year, the crops failed owing to drought and the settlers had to be fed. More than half of the 900 head of cattle introduced to the area died of East Coast Fever. A dip has now been installed to prevent the recurrence of such a calamity. Forty-six of the hundred holdings at Madege, near Babati, were taken up in time for cultivation but the drought in that area was severe and settlers reaped very little in the way of crops. The final laying out of holdings in the Upper Kitete area at Mbulumbulu has been temporarily delayed but will be a first priority in 1962.

In Western Region a settlement scheme at Kaltuma Mbuga in Mpanda District was laid out in 10-acre holdings for unemployed persons in Tabora. 14 families only took plots and their efforts were confined to house building and the clearing of 2–3 acres per family. Tools and food were supplied free.

Two small settlement schemes were begun in Lake Region, one at Buyombe in Geita District for 50 unemployed persons from Mwanza and a second at Kiliwi in Kwimba District. Departmental officers are giving technical assistance with emphasis on proper land use, cropping programmes and demarcation of plots.

Soil Conservation

In Lake Region the practice of ridge cultivation continues to gain momentum. The people of Ukerewe, Mwanza and Maswa Districts are not generally in favour of soil conservation measures and the land is suffering in consequence. In the Arusha Chiefdom there is serious erosion taking place in the River Themi catchment area which, if it continues unabated, will have a disastrous effect on the Arusha water supply. Efforts to persuade farmers of the error of their ways have so far been abortive. In the Meru Chiefdom there was a welcome awareness of the need for soil conservation and the campaign to plant steeply sloping land to bananas in place of grains has continued successfully. The only solution to the flooding which originates in the Makundi catchment area of Eastern Region appears to be the enforcement of legislation to effect soil and water conservation, all other solutions have so far failed. In Central Region some famine relief labour was directed to soil conservation work. In Dodoma District where two large dams are under construction by the Water Development and Irrigation Department at Mloa and Mitita, nearly 20 miles of banks were built in the catchment areas supplying the dams.

SECTION VIII

Irrigation

The system whereby the Water Development and Irrigation Department is responsible for the provision of dam construction, headworks and major irrigation channels and the Agricultural Department is responsible for the field irrigation and drainage channels ontinued to work extremely well.

A Senior Field Officer concentrated his activities in the Kilosa area which is considered to be the area in Eastern Region which will benefit most from material assistance. With money from the Development Funds, materials for building adequate intake gates and weirs are on order. Plans were drawn up to effect improvements in the canal alignment and field layout of the Malolo area as a self-help scheme. The Mlali (Morogoro) Irrigation Scheme had rather a poor season as the river at the worst period of the drought was almost dry, and this delayed the planting of rice, and then later in the year, the scheme suffered damage to the headworks and extensive silting of the river resulted in flooding of the lower plots. An overhead system of irrigation was installed by the Kilombero Sugar Co. At Kalimawe in Tanga Region land along the high-level channel was taken up by local farmers, cleared and planted. There was insufficient water in this channel until November, when there was ample water. The shortage of water in the early part of the year in Northern Region caused some anxiety and a rapid survey was carried out of the existing use of water above and below the 4,500 ft. contour line on both mountains. The information obtained showed that a great deal of water is being wasted owing to inefficient furrows and methods of application. Improvements can be made, but a concentrated study is required, followed by a period of intense propaganda and demonstration work to make the new methods acceptable. Practical help was given to people in irrigation areas near Arusha, and at Mangola and Ndareda in Mbulu improvements were made to intakes and furrows resulting in a considerable increase in the amount of water made available for irrigation. Considerable attention was given to methods in improving furrow irrigation in the area below the Rift Wall. In Iringa District work was started in April on the Kalenga Irrigation Scheme. A main channel and seven offtakes were dug to serve the 60 acres of the scheme, all of which have now been taken up. In Central Region irrigation was almost entirely ruled out by drought. At Mangoinyi the level of the dam fell so low that no irrigation water was available, and at Ikowa the dam dried up completely in September and delayed the planting of the new season's crops. The rain was so heavy towards the end of the year that irrigation was unnecessary although the dam had by then refilled. In Tabora District more rice plots were marked out in the Utyatya Scheme. In Lake Region good yields of paddy were recorded on the Malya Rice Scheme (average 3,000 lb. per acre). Although comparatively large areas of this region are suited to irrigation, the problem of finding a suitable high priced crop retards development. The growing of paddy alone is not sufficiently remunerative to justify expensive irrigation schemes.

SECTION IX

Animal Husbandry

The famine in Central Region resulted in considerable numbers of people being made available for relief work and so allowed the Department to make a start on the demarcation of two grazing schemes, designed at increasing the carrying capacity of the land and reducing the danger of erosion. The schemes were situated at Hombolo in Dodoma District (30,000 acres) and Wiyenzele in Mpwapwa District (20,000 acres). At Hombolo about half of the 27 miles of firebreaks required for the first block were completed, and at Wiyenzele 400 acres of selective bush clearing were completed. Both schemes are aimed, not only at improving feeding for livestock, but as they are situated in dam catchment areas, to preserve the catchment from erosion.

Agricultural staff again assisted in the provision of cattle for Southern Region. From Njombe 800 animals were imported, most of which were sold in Songea District. 269 animals came from Central Region via Kilosa and were bought mainly in Lindi District.

At Mkinga in the coastal area of Tanga, the scheme for the grazing of cattle in coconut groves was very successful, and dipping, which was at first looked on with disfavour, is now accepted as being essential. Other villages in the neighbourhood are making preparations to join the scheme.

Efforts have continued to improve grazing and fodder for cattle notably in Northern and Southern Regions where supplies of seed are made available to stock owners of such grasses as Rhodes and Setaria, and fodder plants such as *Leucaena glauca*. Enclosure of pastures by sisal hedges in Lake Region helped to control grazing. In Southern Highlands the idea of fenced paddocks is slowly taking root in areas such as Mufindi and Njombe.

The demand for improved type cockerels from the centres run in co-operation with the Veterinary Department exceeded the supply, and it is intended to increase the number of centres in 1962. Two rabbit breeding centres were established at Mahiwa and Mtwara in Southern Region. There are not yet sufficient stocks to allow for distribution but local people express keen interest.

SECTION X

Animal Draught and Mechanization

The Tanganyika Agricultural Machinery Testing Unit at Tengeru co-operated throughout the year with the National Institute of Agricultural Engineering in the development of an ox-drawn toolbar which could be quickly adapted by the operator for land preparation, planting, weeding, and transport purposes. Four such units were constructed at Tengeru and three sent out for trial to regions, some useful results were obtained. A prototype papain drier was designed and constructed by the Unit and is undergoing field trials. The Unit co-operated with the Agricultural Officer, Farms and Estates, in the field trials of the N.I.A.E. tie ridging equipment.

The use of tractors and ancillary equipment by individual owners and contractors is on the increase. Most operators lack the necessary equipment to complete a job properly and frequently large areas of land are ploughed and the subsequent hand operations are skimped or not done at all. Agricultural Department staff are frequently asked to advise on the adjustment of equipment and it is encouraging to note that in Mbulu there was a distinct improvement in maintenance as a direct result of the efforts of the Field Officer in charge of the area. The price of contract ploughing varies from Shs. 40/- to Shs. 50/- per acre.

The campaign for encouraging ox-drawn cultivation met with considerable success in some regions and very little in others. Lack of success was usually due to inexperience of working with and caring for animals. Training centres were maintained at Urambo, Mpwapwa, Iramba, Gairo (Kilosa), Chambezi (Bagamoyo), Ulanga District, Rufiji and Malya. It is estimated that there are now in the region of 40,000 ox-ploughs in use in Lake Region (9,000 were sold in Shinyanga alone during the year). 300 ox-ploughs, gifted by the West German Government, were distributed to be awarded to farmers as prizes in various types of competitions.

SECTION XI

Staff Training and Agricultural Education

The educational programme for training African staff, within East Africa and overseas, was greatly expanded during the year. Reference has already been made in the Development Plan section to the proposed Agricultural College at Morogoro, and to the Farm Institutes at Msinga and Seatondale. Plans to extend the accommodation at the Natural Resources School, Tengeru, the Agricultural Training Centre, Ukiriguru, and the Land Planning Training Centre, Morogoro, are now being implemented and will be completed in 1962.

As Makerere University College no longer awards an agricultural diploma it has been necessary to look to Egerton College in Kenya and overseas in order to obtain training of the required standard. This gap will not be closed until the Agricultural College is in being.

The first year of the two-year in-service course was completed at the Natural Resources School, Tengeru. Of the 84 students who started the course, 13 accepted overseas scholarships or transferred to other jobs, 2 resigned, 1 was dismissed and 20 students were returned to the stations from whence they came as being unsuitable for further training. The remaining 48 students will now proceed to the second and final year of the course.

At the Ukiriguru Agricultural Training Centre the two-year course was completed, also the first year of another two-year course, and a one year simplified course. The percentage of passes was high. Two further courses extended to two years and one year commenced at the end of the year, there were 24 enrolments for the former and 46 for the latter. The wives course was completed, all 9 students were successful. A further wives course for which 24 students had enrolled started towards the end of the year. The new land plan for the farm units at the Centre was successfully implemented during the year a boundary dispute of long standing was settled and so allowed the fencing of the farm to be completed.

At the Land Planning Training Centre at Morogoro, two land planning courses were run when 50 Field Assistants in all were given four months training . The course for prospective Junior Survey Assistants was continued throughout the year and will not be completed until June, 1962. A promotional course for Field Assistants aspiring to the rank of Field Officer, was also run. There was an in-training course for Makerere and Egerton College students of Tanganyika origin, this course included visits to centres in Eastern, Central and Western Regions.

A number of in-training courses were run in the various regions. Included were an ox-training and use of small farm machinery course at Urambo and an intensive course for the field staff of Morogoro District in how to put over various aids to the growing of better cotton; this cotton course was conducted by members of the Community Development Department. Twenty-three Field Assistants attended an English background course at Tengeru of three months duration. Various study visits were arranged for officers to Kenya and Uganda.

Overseas courses were many and various. Five officers completed the Moray House teacher training course in Edinburgh, and have been a valuable addition to the existing teaching staff. A further 3 officers started the course in October. One officer undertook a machinery study tour of the Far East, visiting India, Siam, Malaya and Japan. Nine officers spent six months in the U.S.A. to study extension methods of agriculture. A further 4 officers spent various periods in America studying irrigation, soil conservation, extension methods and the production of farming magazines. A party of 10 Field Assistants studied agricultural extension methods and co-operative marketing in Israel for a period of four months. The Senior Fisheries Officer also visited Israel to study fishing methods.

Other members of the senior staff are studying for degrees or diplomas in various parts of the world. In America there are 3 Field Officers studying at State Universities. Two Research Officers are attending the Imperial College of Science and Technology in the United Kingdom, and a Field Officer is reading the Diploma course at Harper Adams Agricultural College. In Canada 2 Field Officers are reading for agricultural diplomas and in Holland a Field Assistant is studying at the Deventer State College of Tropical Agriculture.

SECTION XII

Agricultural Extension Methods

As in the past, various extension methods have been used depending on the problems to be tackled in particular areas, and these may be summarised as follows:—

1. The individual approach to the progressive farmer.
2. Practical demonstrations.
3. Tours and visits.
4. Short instructional courses.
5. Visual aids.
6. Articles in the press.
7. Focal points—concentration on master farmers.
8. Self help schemes and group farming.

As an aid to practical demonstrations all members of the Agricultural Department are required to maintain a good standard of husbandry in their holdings and gardens. In addition, demonstrations are practised on land belonging to individual farmers. It has been found that by encouraging the individual farmer to accept a new method or a new idea on his own land, more impact is likely to be achieved than by setting up separate demonstration plots run entirely by Government.

Exchange visits, both inter-regional and inter-district have been made with useful results. During these visits farmers are enabled to see such things as the effect of proper spraying of coffee against insects and leaf fall, small pyrethrum driers, visits to central coffee pulperies, proper land planning and many other items of value to increasing agricultural production.

Short instructional courses for farmers were held in order to improve the practice of coffee pruning.

Towards the end of the year each region was issued with a camera, slide projector and a screen in order that a series of coloured 35 mm. slides could be built up on various crop activities. These can then be shown to farmers in districts. In addition, posters on pyrethrum, coffee and cotton were produced. In the Eastern Region the Community Development team continued to assist in the demonstration of correct cotton husbandry. The equipment used included flannelgraphs, posters, pamphlets, cinema shows and tape

recordings. It was unfortunate that the season was such a bad one and the results obtained were not impressive. The officers concerned with the scheme are hopeful that with persistence considerable improvements to cotton husbandry can be made.

Officers continued to contribute articles to the vernacular press and also to the agricultural magazine *Ukulima wa Kisasa*. In addition, instructional leaflets on cotton and tobacco were issued at district level. More departmental bulletins were published and these were:—

No. 7—Trogoderma.

No. 8—Field Recognition of Plant Diseases in Tanganyika.

No. 9—Wheat Production in Tanganyika.

No. 10—Vegetable Notes.

No. 11—Not yet published.

No. 12—Farm and Estate Planning in Tanganyika.

No. 13—Plant Pests of Importance in Tanganyika.

No. 14—Soya Beans.

Considerable progress has been made by concentrating on master farmers. Where staff is thin on the ground (as it is in most areas of the country) it has been found that greater progress can be made by concentrating on those farmers who are prepared to accept and use departmental advice than on trying to bring changes over a large body of farmers. In the Western Region the village courses continue to enjoy considerable success in teaching mproved methods of cotton cultivation.

Towards the end of the year it was evident that many small groups of farmers throughout the country were beginning to band together and to cultivate communally, so much so that the newly formed credit agency has been designed to cater for these groups and any groups comprising not less than twenty adult males may apply for registration as an association to the Agricultural Credit Agency, and thus make themselves loanworthy.

In general, it can be said that relations between officers of the Department and the farmer and local authorities improved during the year. A decision has now been taken that no uniform will be worn and thus we are breaking away completely from the old days when an agricultural instructor very often tended to be rather more of a policeman than an adviser.

The agricultural magazine *Ukulima wa Kisasa* continued to make progress during the year. In order to encourage advertisers arrangements were made to join the Audit Bureau of Circulations and the audited circulation figures for 1961 showed an average monthly sale of 20,759 copies. In May, a similar magazine was started in Kenya and a common supplement for both magazines was produced in Dar es Salaam. Unfortunately this did not prove to be either an editorial or financial success and it had to be dropped. It is pleasing to note, however, that *Ukulima wa Kisasa* is now, from a production point of view, entirely self-supporting and it is hoped that recent arrangements concluded with the Secretary-General of the T.A.N.U. Youth League will result in a further circulation increase. The magazine continues to cater for the individual farmer who is encouraged to write in to express his views and about 1,500 letters were dealt with during the year.

In December, a special *Uhuru* edition of 44 pages was produced and our thanks are due to the Co-operative Division, Veterinary Division, Water Development and Irrigation Division, Forestry Division and Ministry of Health for their whole-hearted co-operation in the production of this special edition. It was unfortunate that weather conditions in October and November resulted in a very much decreased circulation due to bad communications. Had this not been so, the average circulation figure would have been higher.

The radio programme *Maarifa ya Ukulima* continued weekly ½-hour broadcasts throughout the year and maintained its popularity. As it is considered that half an hour is too long at a time, plans are now in hand to alter this programme and the programme will be reduced to a quarter of an hour repeated on two days each week. In order to obtain up to date news for this programme, Regional Correspondents for *Ukulima wa Kisasa* have been issued with tape recorders. Through the good offices of the T.B.C. a short course in the use of these recorders enabled correspondents to become familiar with their operation.

SECTION XIII

Fisheries

General

In a year when other sections of the Department were faced with staffing difficulties it is gratifying to record that the Fisheries Division has been able to bring its establishment of senior officers up to full strength. At the end of the year specialist fisheries staff were stationed at Headquarters, the Tanga and Southern sections of the Coast, in the Central Region, on Lake Victoria, and for the first time for several years, on Lake Tanganyika. The fisheries section of the Three-Year Development Plan calls for a further four Field Officers to give complete regional coverage.

Great emphasis has been placed on the training of staff and all Field Assistants and Instructors employed on fisheries duties have passed through a two- to three-month course at Mwanza. Ten of the most promising junior staff have now embarked on a two-year training course based on Mwanza and Ukiriguru, comparable to the agricultural course at Tengeru. As a result of a visit by the Senior Fisheries Officer to Israel, arrangements have been made for a comprehensive sixteen-week course of advanced fisheries training in Israel for Field Assistants. Thanks to the generosity of the Israeli Government, six scholarships have been awarded for this purpose and the selected officers will have completed this training by the end of 1962. One Field Assistant has been awarded a tied bursary to take a degree course overseas qualifying him to be a Fisheries Officer.

In August, the Department was joined by an F.A.O. Fisheries Economist on an eighteen-month assignment to carry out an economic survey of Tanganyika's fishing industry and to advise on the economic problems connected with production, processing, marketing and distribution. By the end of the year all the main fishing areas had been visited and arrangements completed on the ground for the collection of the necessary data, running of sample surveys, etc. Preliminary work has already demonstrated the very complex pattern of the fish trade and interim recommendations have been made to Government on certain aspects of fish marketing.

Marine Fisheries

With the coming of independence, there has been an increasing interest by various overseas concerns in the possibilities of establishing fishing enterprises on our coast, but as yet there have been no firm developments arising from this. However the interest in Tanganyika as a source of supply of such luxury seafood items as prawns, crayfish and crabmeat, has led to an increase in the export of such items by various small local concerns relying mainly on the existing inshore industry for their supplies. The main markets are by air to the Rhodesias and Nairobi, but there have been shipments by sea to the U.S.A. this year.

The interest in the Rufiji Delta area as a source of prawns has made it necessary to declare this a Controlled Area where licences are now required by non-citizens of Tanganyika, both to fish and to purchase fish, prawns and other items covered by the Fisheries Ordinance.

The ring-netting (purse-seining) unit referred to in last year's report continued fishing throughout the year and increased its capacity by a locally-built 53 ft. vessel powered by a 230 h.p. diesel. At all seasons of the year the Tanganyika coast is a windward shore, and at times this method of fishing experienced considerable difficulty with strong winds. Ideal conditions of sheltered fishing are obtainable within the lee of Zanzibar Island but this method of fishing in their waters is not acceptable to the Zanzibar Government.

In spite of such operational difficulties, the unit was making useful contributions to the fresh fish supplies of Dar es Salaam with landings averaging 50 tons per month of pelagic fish, principally sardines (*Sardinella spp.*).

In conjunction with Tanganyika Packers Ltd. experiments have been carried out on the production of a cheap pack of local sardines for consumption in East Africa. Reports are now awaited on the local marketing possibilities of sardines packed in brine. The East African sardine is a much larger and coarser fish than some other species which are canned in other parts of the world. This, coupled with the stringent quality standards and highly competitive nature of the canned sardine trade makes it unlikely that Tanganyika sardines could compete on world markets but the apparent regular availability of supplies points to the need for further technological investigations on their utilization in view of the limited market for such fish in a fresh form.

There have been no spectacular advances in the inshore fishing, but the change over to nets and lines of synthetic fibre continues and the interest in mechanization of local craft remains centred on outboard engines.

The early arrival and prolonged nature of the rains on the coast had an adverse effect on the normal methods of smoking and drying fish. This gave added point to the need to improve these methods of preservation which are of great importance to coastal fishermen in such areas as the Southern Region with only limited local markets for fresh or lightly-cured fish.

The main emphasis of extension work on the coast is now on improvements to fish preservation. A simple and cheap portable fish smoking oven of a type which has proved useful in the Far East and Ghana, is now undergoing trials, and has aroused considerable interest amongst fishermen. The coastal fishermen and traders are in a favourable position for the increased production of high-quality smoked fish since there is no shortage of a most suitable fuel in the shape of coconut husks.

Inland Fisheries

The abnormal weather conditions experienced this year had a profound effect on the inland fisheries in many areas. The failure of the rains early in the year in the Central Region led to the total drying out of many dams and small lakes such as Kindai, Singida and Gombo, on which there were established commercial fisheries. Other waters such as the large Hombolo and Mianje Dams were reduced to a level at which fishing became exceedingly difficult. The absence of the normal flood regime on certain river systems such as the Rufiji on which the fisheries mainly depend on an interchange of fish populations between the open river and the permanent or temporary lakes, swamps, etc., of the flood plain, will almost certainly have long range effects.

Later in the year the early continuous and heavy rains of the 1961/2 season rapidly filled all the fisheries that had earlier dried out and, at the end of the year, many of these were at their highest level for years. Whilst on balance, these heavy rains will be of long-term benefit to the fisheries, they brought many attendant difficulties in their train. Flooding rendered many waters which required urgent re-stocking difficult of access, many fixed traps were destroyed by flood debris and there was extensive flooding of many fishing beaches. In certain of the larger dams such as Hombolo (Central Region) and Igombe (Western Region) very large quantities of fish were washed over the spillways. This may well be of ultimate benefit to the fisheries, since overstocking is one of the major problems in such dams. Everywhere, including the great lakes fisheries, the rains caused acute difficulties in the smoking and drying of the catch. This was particularly the case on Lake Tanganyika, where the main produce *Dagaa* (*Stolothrissa Tanganicae*) is sun-dried.

Two important shallow-lake fisheries, Rukwa in the Southern Highlands Region, and Kitangiri in Central Region, were fortunately unaffected by drought and both enjoyed a good year. Early results of the Economic Survey previously referred to, indicate the importance of these lakes in the fish trade. Both are supplying smoked and dried fish to markets remote from the fishery. There are considerable sales of Rukwa fish in Tanga Region and Kitungiri fish are being marketed as far afield as Kisumu in Kenya. This is in part due to the fact that these fisheries are exploited by fishermen and traders from many parts of East Africa, who tend to deal in the markets with which they were familiar before. The very considerable increase in fishing at Kitungiri this year was due in large measure to an influx of fishermen from other waters in the Central Region which had dried out.

Lake Victoria, of which 13,450 square miles lie within Tanganyika's boundaries, remains our most important single fishery although both the distribution of the various species of fish and the fishery conditions vary so much over such a vast area that it is by no means a homogenous fishery. Trends of interest in 1961 were an increasing tendency for the fishermen to operate further offshore and to utilize the offshore islands as fishing bases, and the rise in relative importance in overall landings of the species of fish other than the indigenous *Tilapia* which formerly bore the brunt of the fishery. The predaceous catfish, *Bagrus*, now comprises a third of the landings by weight and there is a much greater utilization of *Haplochromis* and *Synodontis*. The introduced species *Tilapia Zillii* and *Tilapia Nilotica* are now figuring regularly in fishermen's catches.

On Lake Tanganyika the main interest continues to centre on the *dagaa* (*Stolothrissa*) fishery which has enjoyed a good year other than the difficulties with drying referred to previously. There has been an increase in the importance of Northern Rhodesia as an export market, and due to the currency and other difficulties, very little dried *dagaa* is now exported to the Congo or Ruanda-Urundi.

A number of European owned and operated ring-netting units had been fishing in the Congo and Ruanda-Urundi waters of Lake Tanganyika. With recent political developments in these countries a number of these units became interested in transferring their activities to Tanganyikan water. If the existing fishery and fish marketing structure are not to be severely disrupted some control will become necessary. Accordingly Lake Tanganyika has been declared a Controlled Area under the Fisheries Ordinance and licences are required by non-citizens both to fish and to purchase fish. One such ring-netting unit has been licenced for operation from Kigoma and local Africans are showing considerable interest both in investing in the company and in learning the fishing techniques. Heavy catches of Nile Perch (*Lates spp.*) and *migebuka* (*Luciolates stappersi*) are regularly landed during the dark periods of the moon. Production is far in excess of the limited needs of the local market and future progress of the enterprise depends on the installation of suitable cold storage and processing equipment for transport and sales of the fish elsewhere in Tanganyika. This is now in hand.

In the south-west of Tanganyika, the movement of the building of family fish ponds continues its steady growth. The estimated number of ponds in the Southern Region, principally Songea District, is now 7,000 and 40 ponds were completed in the Mbeya District of Southern Highlands Region during the year.

The field staff of the Fisheries Division stationed on inland waters have been particularly concerned with training; some 60 Field Assistants and Instructors having passed through the Mwanza centre during the year. In all areas where specialist fisheries staff are available, a survey of production and fish marketing has commenced. The severe drought in the Central Region led to the necessity for most of the fisheries staff there to be engaged on famine relief duties but by the end of the year they had achieved very considerable success in the mammoth task of re-stocking many lakes and dams.

Again, on inland waters as on the coast, particular emphasis is being given to improvements to fish preservation. Improvements to fishing craft are an important feature of our programme, and at Mwanza improved craft are being built for trial in various other inland waters, and training is being given in boat building.

SECTION XIV

Research

A full report of the Research Division is given in Part II of the Annual Report. The coffee and sisal commodity stations, mainly staffed by members of the Agricultural Division. publish their own reports.

A few senior members of the staff have resigned and many of the junior staff have been sent abroad on special courses.

Soil Fertility

At Mwanhala (Western Region) the continued application of fertilizer or farmyard manure for periods of four to five years has resulted in greatly improved yields. Responses in later years are several times those recorded in the first year, and it would appear that the basic productivity of the soil is being greatly improved. Responses of the order 2,000 lb. per acre for maize and 800 lb. for groundnuts are being recorded. This general improvement by continued regular applications has been shown to occur in other areas. At Ukiriguru (Lake Region) the magnitude of the response to nitrogen by cotton is related to the amount of rain falling in the period January to March. If it is low, then the response is low, if it is high then the response is high.

Coffee

Hedge coffee at Mbozi continued to yield well at 11·4 cwt. per acre. This again is very much higher than the general yield level in other experiments of 2–4 cwt. In experiments testing the value of copper spraying useful increases in yield were obtained. Copper spraying may also prove useful in Bukoba.

Tea

At Maruku mulching and sulphate of ammonia are clearly necessary for production and shade appears to be deleterious.

Cereal Crops

Two maize breeding programmes have been started, one for high altitudes and the other for low, at Tengeru and Ilonga.

Legume Crops

A breeding and selection programme of the important food legume crops has been started at Ukiriguru. A large number of potential new varieties (700) of soya beans tested at Nachingwea. Some yielded over 2,000 lb. per acre. A few of the new varieties have higher oil contents then the varieties from which they were derived but contents over 20 per cent are rare.

Oil Seeds

For sesame, the cross Morada × Local appears to be the most promising but some lines derived from Inamar × Acarigua are also very promising, as is one local selection. The breeding programme on indehiscence is being re-orientated since the character used is proving unsuitable. Varieties containing three new characters for indehiscence have been obtained from U.S.A.

Work has started at Chambezi (Eastern Region) to study the value of fertilizers for cashew nut production. At Ilonga some of the highest yielding groundnut varieties from the large collection there have been appraised for confectionery quality and small bulks are being produced for distribution.

Tobacco

Research work at Seatondale and Urambo has largely achieved its object of determining the best methods for producing flue-cured tobacco in those areas. At Seatondale, a soil fumigant (DD) was tested for Eelworm control on a number of areas with different cropping histories. In all cases increases in yield were noted, these varied from 154 lb. to 560 lb. per acre. The results also showed that even if Eelworm is controlled by chemical means this is no substitute for a good rotation. Other experiements also showed substantial increases in yield from Eelworm control. Fire-cured tobacco at Suluti (Southern) gave good responses to phosphate and nitrogen, low topping reduced yield appreciably.

Pyrethrum

The fertility experiments continued to yield interesting results. A number of the most promising clones are being bulked for distribution to growers.

Cocoa

A detailed soil survey of a cocoa producing estate was carried out and this yielded usefu information on the types of soil in Tanga Region which might be useful for growing cocoa.

Pasture Research

The Kongwa Pasture Research Station was taken over from the Tanganyika Agricultural Corporation. At Tengeru a number of very promising Rhodes grass strains, varying in useful characteristics, were obtained from single plant selections. A comprehensive programme has been started at Urambo.

SECTION XV

Nutrition

The main problem and the main emphasis in this field is to try and ensure that, with the ever increasing production of cash crops sufficient vegetable, animal and fish protein is included in the diet. To this end farmers are encouraged, in suitable areas such as the Southern Highlands and Southern Regions, to construct fishponds. Efforts continue with some success to introduce improved strains of poultry to upgrade local stock. Vegetable production is on the increase and more meat is being eaten. In some areas, the problem of nutrition is as much a sociological as an agricultural one, and age-old prejudices against the use of such valuable items as milk, eggs and fish has to be overcome. The department works in close co-operation with the Medical Officer (Nutrition) and assists wherever possible in trials and surveys. The agricultural magazine *Ukulima wa Kisasa* (Modern Farming) mentioned elsewhere in this Report, carries a regular women's page dealing, among other things, with proper diet for the whole family—emphasizing as far as possible the use of, and proper preparation of, items of diet readily obtainable locally. From time to time special supplements on nutrition are published.

APPENDIX I

RAINFALL FIGURES BY STATIONS

(Not included in this year's Report.)

APPENDIX II

CROP PRODUCTION FIGURES

Sisal

Year	*Production in tons*
1958	196,567
1959	205,273
1960	204,468
1961	197,968

Coffee

Mild Coffee

Tons of clean coffee

Region	1958	1959	1960	1961
Northern	8,475	10,303	16,585	9,511
Southern Highlands	2,467	2,744	2,996	2,125
Southern	626	1,083	1,133	1,500
Tanga	515	513	656	479
Western	–	3	6	55
	12,083	14,646	21,378	13,670

Hard Coffee

Tons of clean coffee

Region	1958	1959	1960	1961
West Lake	*	8,948	8,570	5,358
Eastern	255	265	1,004	626
Lake	9,040	55	36	180
Tanga	48	88	64	40
Western	35	67	72	30
	9,742	9,423	9,746	6,234

Cotton

Production in bales of 400 lb.

Region	1958	1959	1960	1961
Lake	151,608	182,623	160,652	157,690
Eastern	14,421	13,313	16,547	3,640
Tanga	2,518	2,307	4,148	550
Northern	1,947	2,135	5,000	1,794
Western	897	914	1,906	3,152
Southern	42	–	–	–
West Lake	–	316	318	685
	171,433	201,608	188,571	167,511

Cashewnuts

Tons of nuts sold through local markets

Region	1958	1959	1960	1961
Southern	18,679	24,102	41,288	25,933
Tanga	–	20	52	60
Eastern	1,877	4,279	13,912	2,586
	20,556	28,401	55,252	28,579

*Figures have previously been included in Lake Province production.

CASSAVA

Tons sold through local markets

Region	1958	1959	1960	1961
Southern	20,929	17,761	13,859	14,639
Western	5,888	6,180	2,937	6,443
Lake	1,624	2,750	11,500	4,818
Eastern	168	359	1,352	221
Tanga	56	–	9	18
Central	16	127	2	–
Southern Highlands	–	15	–	–
	28,679	27,192	29,659	26,139

COCONUTS

Tons of copra

Region	1958	1959	1960	1961
Eastern	5,423	5,218	4,855	3,896
Tanga	4,533	5,751	4,210	4,350
Southern	999	637	479	446
	10,955	11,606	9,544	8,692

MAIZE

Tons sold through local markets

Region	1958	1959	1960	1961
Northern	26,500	22,000	26,000	3,800
Southern Highlands	15,282	13,865	13,893	10,696
Western	8,048	11,400	14,046	12,099
Eastern	6,000	7,355	5,793	6,660
Lake	5,176	5,289	5,101	4,429
Southern	3,007	5,273	5,120	7,371
Tanga	2,305	2,366	4,333	2,290
Central	1,294	2,575	3,413	2,677
West Lake	*	31	247	364
	67,714	70,154	77,946	50,386

OIL SEEDS

(a) *Castor Seed*

Tons sold through local markets

Region	1958	1959	1960	1961
Central	3,030	3,207	5,833	3,390
Northern	1,700	1,615	1,850	950
Southern	1,114	847	823	684
Eastern	747	619	1,525	1,503
Southern Highlands	322	451	386	352
Lake	48	–	–	–
Western	12	30	45	41
Tanga	–	87	407	20
West Lake	–	58	56	40
	6,973	6,194	10,925	6,980

*Included in Lake Region tonnage.

(b) *Cotton Seed*

Tons surplus to seed requirements

Region	1958	1959	1960	1961
Lake	47,871	54,900	45,433	44,672
Eastern	4,593	4,100	4,334	317
Northern	1,450	650	1,650	340
Tanga	1,092	850	900	75
West Lake	–	50	50	44
Western	–	350	450	576
	55,006	60,900	52,817	46,024

(c) *Groundnuts*

Tons sold through local markets

Region	1958	1959	1960	1961
Western	3,597	3,900	11,000	3,709
Central	3,268	7,725	6,772	1,062
Southern	1,575	3,406	3,627	3,567
Lake	937	677	1,235	229
Northern	200	60	40	20
Southern Highlands	129	140	133	152
Eastern	–	10	11	9
West Lake	–	9	32	36
	9,706	15,927	22,862	8,784

(d) *Sesame*

Tons sold through local markets

Region	1958	1959	1960	1961
Southern	6,236	8,673	7,290	5,398
Eastern	556	812	1,171	1,133
Southern Highlands	151	345	339	300
Lake	63	178	270	461
Western	41	75	320	175
Central	1	77	87	35
Tanga	–	–	5	3
	7,048	10,160	9,482	7,505

(e) *Sunflower*

Tons sold through local markets

Region	1958	1959	1960	1961
Eastern	2,717	181	676	1,020
Western	2,516	2,200	3,766	2,891
Southern Highlands	1,099	988	1,085	632
Southern	1,024	480	646	1,094
Lake	737	143	363	391
Central	347	636	706	226
Northern	320	100	65	45
Tanga	87	17	7	3
	8,847	4,735	7,314	6,302

RICE

Tons of paddy sold through local markets

Region	1958	1959	1960	1961
Lake	8,647	4,172	2,559	2,681
Southern Highlands	8,450	7,070	3,108	4,896
Eastern	5,864	7,078	11,450	9,173
Western	3,025	2,950	10,311	25
Tanga	2,467	6,513	4,564	3,630
Southern	1,271	2,279	2,433	2,274
Northern	160	260	400	245
Central	25	40	34	3
	29,909	30,362	34,859	22,927

PULSES

(Including yellow peas, chickpeas, soya, mixed beans, cowpeas, grams, pigeon peas, bambarra nuts)

Region	1958	1959	1960	1961
Northern	3,640	6,189	10,210	4,063
Lake	3,099	965	1,094	2,548
Southern Highlands	2,077	2,690	2,126	1,840
Southern	1,672	1,763	5,721	3,589
Western	1,039	1,690	2,569	5,609
Tanga	624	600	924	379
Eastern	603	1,201	845	643
Central	49	–	294	104
West Lake	–	200	660	893
	12,803	15.298	24,443	19,668

PYRETHRUM

Tons of dried flowers

Region	1958	1959	1960	1961
Northern	376	483	553	640
Southern Highlands	249	326	457	634
	625	799	1,010	1,274

SEED BEANS

Tons exported

Region	1957/58	1958/59	1959/60	1960/61
Northern	3,420	3,885	5,000	1,920
Southern Highlands	–	3	21	21
	3,420	3,888	5,021	1,941

TEA

Manufactured in lb.

Region	1957	1958	1959	1960	1961
Southern Highlands	3,993,407	4,122,245	5,202,810	5,003,750	5,831,638
Tanga	2,133,177	2,205,929	2,951,724	3,201,764	3,998,323
	6,125,584	6,328,174	8,154,534	8,205,514	9,829,961

TOBACCO

Cured leaf in lb.

(a) *Flue-cured*

Region	1958	1959	1960	1961
Southern Highlands	2,748,480	3,589,488	2,861,736	2,322,880
Western	927,360	1,164,800	1,108,800	1,312,733
Southern	17,920	6,720	–	–
Lake	–	–	–	–
West Lake	–	8,960	–	–
	3,693,760	4,769,968	3,970,536	3,635,613

(b) *Fire-cured*

Region	1958	1959	1960	1961
Southern (Songea)	1,272,320	1,144,640	1,046,080	2,136,960
Eastern	389,760	–	–	–
West Lake (Nyamirembe)	85,120	206,080	51,520	150,080
	1,792,200	1,350,720	1,097,600	2,287,040

WATTLE EXTRACT

Production in tons

Region	1960	1961
Tanga	480	530
Southern Highlands	6,115	6,326
	6,595	6,856

WHEAT

Tons sold through organized markets

Region	1958	1959	1960	1961
Northern	5,996	6,910	11,397	5,065
Southern	347	188	158	154
Southern Highlands	130	105	–	75
Western	59	60	81	130
Eastern	29	13	24	20
	6,561	7,276	11,660	5,444

SUGAR

Production in tons

Region	1958	1959	1960	1961
Northern	21,133	26,791	26,963	26,713
West Lake	–	850	1,661	2,006
	21,133	27,641	28,624	28,719

ONIONS

Tons marketed

Region	1958	1959	1960	1961
Northern	1,820	3,575	4,612	3,782
Central	268	1,982	1,584	725
Southern Highlands	211	220	200	550
Southern	22	40	21	9
Tanga	14	520	400	275
Lake	10	32	30	32
Western	6	5	17	62
Eastern	–	162	1,188	1,200
West Lake	–	5	6	2
	2,331	6,541	8,058	6,637

GUMS

Arabic and Copal in tons marketed

Region	1958	1959	1960	1961
Western	235	460	690	352
Lake	129	925	655	250
Central	111	302	353	441
Southern	1	3	2	2
	477	1,690	1,700	1,045

KAPOK

Tons marketed

Region	1958	1959	1960	1961
Eastern	732	655	814	782
Tanga	311	236	163	143
Southern	13	11	9	21
	1,056	902	986	946

OIL PALM

(a) *Palm oil in tons marketed*

Region	1958	1959	1960	1961
Western	39	50	65	278
Tanga	–	30	30	40
	39	80	95	318

(b) *Kernels in tons marketed*

Region	1958	1959	1960	1961
Western	378	450	726	796
Tanga	–	20	35	50
	378	470	761	846

EXPORTS FROM TANGANYIKA OF AGRICULTURAL PRODUCTS, 1957–61

APPENDIX III

	Maximum Exports prior to 1961		1957	1958	1959	1960	1961	Export Value 1961
	Year	Tons	Tons	Tons	Tons	Tons	Tons	£
Sisal	1959	208,767	181,815	198,130	208,767	207,225	200,907	14,028,099
Cotton Lint	1960	38,869	28,311	30,229	30,704	38,869	29,668	6,794,342
Cotton Seed	1957	8,387	8,386	7,520	5,011	5,460	2,188	49,915
Cotton Seed Oil ...	1957	1,981	1,981	1,148	1,262	297	4	577
Coffee	1960	25,077	18,481	22,225	19,607	25,077	24,615	6,762,418
Beans and Pulses ...	1952	23,184	5,368	9,521	11,410	11,545	7,219	463,789
Beans, Soya	1957	1,483	1,483	696	1,049	1,330	1,940	75,778
Cashew Nuts ...	1960	36,718	33,651	31,310	33,209	36,718	39,961	1,804,973
Castor Seed	1960	18,357	13,894	17,858	14,195	18,357	10,749	548,895
Cassava (incuding Flour)	1956	24,000	20,051	17,777	13,690	12,359	18,872	299,166
Copra...	1928	9,318	236	2,339	3,901	1,010	2,391	113,492
Groundnuts	1936	22,786	16,090	12 624	12,124	14,639	3,442	232,158
Gum Arabic ...	1950	2,319	684	503	1,843	1,412	526	37,042
Gum Copal	1950	110	40	13	12	55	20	1,282
Kapok	1957	905	905	862	857	863	840	78,121
Maize...	1956	106,363	9,071	1,224	6,163	43,700	2,453	43,881
Millets and Sorghum	1955	13,150	899	2,563	1,797	3,452	1,187	26,777
Onions	1949	2,418	171	40	68	92	73	3,219
Palm Kernels ...	1960	922	454	662	898	922	880	36,544
Papain	1948	130	23	68	75	72	71	115,577
Pyrethrum	1960	1,010	292	613	544	1,010	1,274	354,000
Rice	1938	17,965	1,853	919	103	2,216†	1,132	58,618
Sesame	1959	11,208	8,180	8,496	11,208	10,800	11,060	757,312
Sunflower Seed ...	1957	19,626	19,626	11,557	5,702	12,473	10,672	333,522
Tea	1960	3,160	2,176	2,339	2,687	3,160	3,163	1,336,657
Tobacco	1948	1,421	342	217	314	731	480	80,572
Vegetable Oils ...	1940	2,268	57	28	200	142	175	15,756
Wattle Bark	1955	4,837	1,525	865	1,341	1,376	1,704	30,492
Wattle Bark Extract...	1960	6,695	*	*	4,980	6,695	7,452	369,424
Other Oil Seeds and Oil Nuts	1959	1,142	*	1,029	1,142	677	1,086	27,508
Essential Oils ...	1959	5	4	4	5	3	5	19,192
Total ...	—	—	376,049	383,379	394,865	462,737†	386,209	34,899,098

*Figures not available. †Amended tonnage figures.

ITEMS NOT INCLUDED IN PREVIOUS REPORTS

	1961 Tons	1961 Export Value £
Chillies	24	... 3,847
Cinchona Bark	103	... 13,553
Coconut Cake	3,789	... 71,720
Coir	2,730	... 66,667
Cotton Seed Cake	18,759	... 415,107
Maize Meal and Flour	18,793	... 314,457
	44,198	... 885,351